(wherein R^2 and R^3 are independently selected from the group consisting of straight-chain or branched alkyl groups containing 1-21 carbon atoms, and R^4 is an alkylene group containing 1-21 carbon atoms); m is an integer of at least 1, having an average of 4-20; A^1 is an alkylene group containing 3 or 4-carbon atoms; and n is 0 or an integer of at least 1, having an average of 0-15; wherein (C_2H_4O) and (A^1O), in case of the average of n being 1-15, are linked random-wise and/or block-wise; with

(II) at least one selected from the group consisting of a quinone type digestion assistant and a polysulfide.

2. (Amended) An assistant for digesting for a lignocellulose material, which comprises a combination of:

(I) a nonionic surfactant (B) obtained by addition of an alkylene oxide to an aliphatic alcohol, said nonionic surfactant (B) comprising one or more compounds represented by the general formula (3):

$$R^5\text{-O-}[(C_2H_4O)_p \,/\, (A^2O)_q]\text{-H} \tag{3}$$

wherein R^5 is a straight-chain, branched or cyclic aliphatic hydrocarbyl group containing 4-24 carbon atoms; p is an addition molar number' of 4-20; A^2 is an alkylene group containing 3 or 4 carbon atoms; and q is an addition molar number of 0 or 1-15; wherein (C_2H_4O) and (A^1O), in case of the average of q being 1-15, are linked random-wise and/or block-wise; said nonionic surfactant (B) having a weight-average molecular weight (Mw) and a number-average molecular weight (Mn) providing a ratio of Mw/Mn satisfying the relationship

$$Mw/Mn \leq -0.183 \times K^{0.930} \times LnX + 1.327 \times K^{-0.065} \tag{4}$$

wherein LnX is a natural logarithm of X; X is an average addition molar number of the alkylene oxide per 1 mole of the aliphatic alcohol; and K is the number of carbon atoms in R^5 of the general formula (3); with

(II) at least one selected from the group consisting of a quinone type digestion assistant and a polysulfide.

3. (Amended) The assistant of Claim 1, wherein said nonionic surfactant (A) has an HLB of 6-18.

4. (Amended) An assistant for digesting a lignocellulose material, which comprises a combination of:

(I) at least one anionic surfactant selected from the group consisting of an anionic surfactant (C) represented by the general formula (5) and an anionic surfactant (D) comprising one or more compounds represented by the general formula (6):

$$R^6\text{-}SO_3M^1 \qquad\qquad (5)$$

$$\{R^6\text{-}O\text{-}(A^3O)_r\text{-}\}_k \overset{\displaystyle O}{\overset{\displaystyle \|}{P}}(\text{-}OM^2)_{3\text{-}k} \qquad\qquad (6)$$

wherein R^6 is a straight-chain, branched or cyclic aliphatic hydrocarbyl group containing 4-24 carbon atoms; A^3 is an alkylene group containing 3 or 4 carbon atoms; r is 0 or an integer of at least 1, having an average of 0-15; k is an integer of 1 or 2; and M^1 and M^2 are monovalent cations; with

(II) at least one selected from the group consisting of a quinone type digestion assistant and a polysulfide.

5. (Amended) ~~An assistant for digesting a lignocellulose~~ material, which comprises:

(a) at least one nonionic surfactant selected from the group consisting of a nonionic surfactant (A) and a nonionic surfactant (B) ; together with

(b) at least one anionic surfactant selected .from the group consisting of an anionic surfactant (C), an anionic surfactant (D) and anionic surfactant (E);

in a weight ratio of 100/0.1 - 100/30;

said nonionic surfactant (A) comprising one or more compounds represented by the general formula (1); said nonionic surfactant (B) being obtained by addition of an alkylene oxide to an aliphatic alcohol and comprising one or more compounds represented by the general formula (3) and having a weight-average molecular weight (Mw) and a number-average molecular weight (Mn) providing a ratio of Mw/Mn satisfying the relationship (4); said anionic surfactant (C) comprising one or more compounds represented by the general formula (5); said anionic surfactant (D) comprising one or more compounds represented by the general formula (6); and said anionic surfactant (E) comprising one or more compounds represented by the general formula (7):

$$R^1 \text{-O-}[(C_2H_4O) / (A^1O)_n]\text{-H} \qquad\qquad (1)$$

$$R^5 \text{-O-}[(C_2H_4O)p/A_2O)_q]\text{-H} \qquad\qquad (3)$$

$$R^6 \text{-SO}_3 M^1 \qquad\qquad (5)$$

$$\{R^6\text{-O-}(A^3O)_r\text{-}\}_k\overset{\overset{\textstyle O}{\textstyle \|}}{P}(\text{-OM}^2)_{3-k} \tag{6}$$

$$R^7\text{-O-}(A^4O)_s\text{-}R^8\text{COOM}^3 \tag{7}$$

wherein R^1 is a branched alkyl group containing 4-24 carbon atoms represented by the general formula (2):

$$\underset{\underset{\textstyle R^3}{\textstyle |}}{R^2\text{-CH-}R^{4-}} \tag{2}$$

(wherein R^2 and R^3 are independently selected from the group consisting of straight-chain or branched alkyl groups containing 1-21 carbon atoms, and R^4 is an alkylene group containing 1-21 carbon atoms), R^5 and R^6 are straight-chain, branched or cyclic aliphatic hydrocarbyl groups containing 4-24 carbon atoms; R^7 is a straight-chain or branched alkyl group, alkenyl group, or mono- or di-hydroxyalkyl group, containing 4-24 carbon atoms; R^8 is an alkylene group containing 1-6 carbon atoms; m is an integer of at least 1, having an average of 4-20; p is a number of 4-20; A^1, A^2, A^3 and A^4 are alkylene groups containing 3 or 4 carbon atoms; n, r and s are 0 or an integer, of at least 1, having an average of 0-15; q is an addition molar number of 0 or 1-15; k is an integer of 1 or 2; M^1, M^2 and M^3 monovalent cations; wherein (C_2H_4O) and (A^1O), in case of the average of n or q being 1-15, are linked random-wise and/or block-wise;

$$Mw/Mn \leq -0.183 \times K^{-0.930} \times LnX + 1.327 \times K^{-0.065} \tag{4}$$

wherein LnX is a natural logarithm of X; X is an average addition molar number of the alkylene oxide per 1 mole of the aliphatic alcohol; and K is the number of carbon atoms in R^5 of the general formula (3).

6. (Amended) The assistant of Claim 5, which is used in combination with at least one selected from the group consisting of a quinone type digestion assistant and a polysulfide.

7. (Amended) A method for producing a pulp, which comprises digesting a lignocellulose material with an alkali or a sulfite in the presence of a digestion assistant; said assistant comprising at least one assistant (I) selected from the group consisting of:

(A) a nonionic surfactant comprising one or more compounds represented by the general formula (1):

$$R^1 \text{-O-}[(C_2H_4O) / (A^1O)_n]\text{-H} \qquad (1);$$

(B) a nonionic surfactant, obtained by addition of an alkylene oxide to an aliphatic alcohol, comprising one or more compounds represented by the general formula (3):

$$R^5 \text{-O-}[(C_2H_4O)_p / (A^2O)_q]\text{-H} \qquad (3);$$

and having a weight-average molecular weight (Mw) and a number-average molecular weight (Mn) providing a ratio of Mw/Mn satisfying the relationship (4);

$$Mw/Mn \leq -0.183 \times K^{-0.930} \times LnX + 1.327 \times K^{-0.065} \qquad (4);$$

(C) an anionic surfactant comprising one or more compounds represented by the general formula (5):

$$R^6 \text{-SO}_3 M^1 \qquad (5)$$

(D) an anionic surfactant comprising one or more compounds represented by the general formula (6):

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$$\{R^6\text{-O-}(A^3O)_r\text{--}\}_k P(\text{-OM}^2)_{3\text{-}k} \qquad\qquad (6)$$

wherein R^1 is a branched alkyl group containing 4-24 carbon atoms represented by the

general formula (2):

$$R^2\text{-CH-}R^4\text{-} \\ \overset{|}{R^3} \qquad\qquad (2)$$

wherein R^2 and R^3 are independently selected from the group consisting of straight-

chain or branched alkyl groups containing 1-21 carbon atoms, and R^4 is an alkylene

group containing 1-21 carbon atoms); R^5 and R^6 are straight-chain, branched or cyclic

aliphatic hydrocarbyl groups containing 4-24 carbon atoms; m is an integer of at least 1,

having an average of 4-20; p is a number of 4-20; A^1, A^2 and A^3 are alkylene groups

containing 3 or 4 carbon atoms; n and r are 0 or an integer of at least 1, having an

average of 0-15; q is an addition molar number of 0 or 1-15; k is an integer of 1 or 2; M^1

and M^2 are monovalent cations wherein (C_2H_4O) and (A^1O), in case of the average of n

or q being 1-15, are linked random-wise and/or block-wise; LnX is a natural logarithm of

X; X is an average addition molar number or the alkylene oxide per 1 mode of the

aliphatic alcohol; and K is the number of carbon atoms in R^5 of the general formula (3).

8. (Amended) The method of Claim 7, wherein said assistant (I) is used

together with at least one component (II) selected from the group consisting of a

quinone type digestion assistant and a polysulfide.

9. (Amended) The method of Claim 8, wherein the assistant (I) is added

beforehand prior to addition of the quinone type digestion assistant and/or the

polysulfide, and after their addition, digesting is carried out.

10. (Amended) The method of Claim 9, wherein the lignocellulose material is heated after, during and/or before addition of the assistant (I).

Please add new claims 11-20 as follows:

11. (NEW) The assistant of Claim 2, wherein said nonionic surfactant (B) has an HLB of 6-18.

12. (NEW) The assistant of Claim 1, wherein said components (I) and (II) are used in a weight ratio of 1/400 - 5,000/1.

13. (NEW) The assistant of Claim 2, wherein said components (I) and (II) are used in a weight ration of 1/400 - 5,000/1.

14. (NEW) The assistant of Claim 4, wherein said components (I) and (II) are used in a weight ratio of 1/400 - 5,000/1.

15. (NEW) The assistant of Claim 5, which comprises said nonionic surfactant (B), or a combination thereof with said anionic surfactant (C) or (E).

16. (NEW) The assistant of Claim 5, which comprises said nonionic surfactant (A), or a combination thereof with said anionic surfactant (C) or (E).

17. (NEW) The method of Claim 7, wherein said assistant (I) comprises:

(a) at least on nonionic surfactant selected from the group consisting of said nonionic surfactant (A) and said nonionic surfactant (B); together with

(b) at least one anionic surfactant selected from the group consisting of said anionic surfactant (C), said anionic surfactant (D) and an anionic surfactant (E);

in a weight ratio of 100/0.1 - 100/30; said anionic surfactant (E) comprising one or more compounds represented by the general formula (7):

$$R^7-O-(A^4O)_s-R^8 \ COOM^3 \qquad (7)$$

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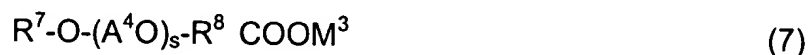
Wherein R^7 is a straight-chain or branched alkyl group, alkenyl group, or mono- or di-hydroxyalkyl group, containing 4-24 carbon atoms; R^8 is an alkylene group containing 1-6 carbon atoms; A^4 is an alkylene group containing 3 or 4 carbon atoms; s is 0 or an integer of at least 1, having an average of 0-15, and M^3 is a monovalent cation.

18. (NEW) The method of Claim 7, wherein digesting is carried out with a digesting liquor, containing said assistant (I) in an amount of 0.001-2% by weight based on the oven-dry weight of the lignocellulose material.
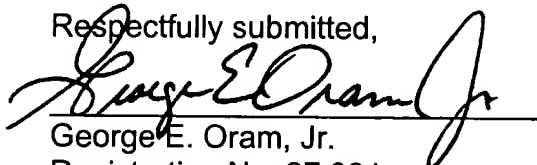
19. (NEW) The method of Claim 7, wherein said components (I) and (II) are used in a weight ratio of 1/400 - 5,000/1.

20. (NEW) The method of Claim 8, wherein said quinone type digesting assistant is at least one selected from the group consisting of benzoquinone, naphthoquinone, anthraquinone, anthrone, phenantherenequinone, nuclear-substituted derivates of these quinines, antrhahydroquinones, tautomers of anthrahydroquinones, 9,10-diketohydroanthracenes and 9,10-dioxyhdroanthracenes.

REMARKS

Claims 1-20 are pending in this application. By this Amendment, claims 1-10 are amended to correct the multiple dependency thereof and to place this application into better condition for examination. No new matter is added.

Respectfully submitted,

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